caNanoLab Glossary

Acronyms, objects, tools and other terms referred to in the chapters or appendixes of this caNanoLab Online Help are described in this glossary.

Term	Definition
% of control	The ratio of assay signal in the sample treated with the experimental agent to that of samples treated with the control. This ratio is expressed as a part per 100.
% purity for sample	The percentage of the assayed material that is comprised of the sample of interest.
2D-circle	A ring-shaped structure with every point equidistant from the center.
2D-diamond	The shape has four distinct sides making a parallelogram with two inner obtuse angles and two inner acute angles.
2D-ellipse	A closed plane curve resulting from the intersection of a circular cone and a plane cutting completely through it, especially a plane not parallel to the base.
2D-parallelogram	A quadrilateral whose opposite sides are both parallel and equal in length.
2D-polygon	A closed plane figure bounded by straight sides.
2D-rectangle	A parallelogram with four right angles. A square is a special rectangle with four equal sides.
2D-square	A plane rectangle with four equal sides and four right angles; a four-sided regular polygon.
2D-trapezoid	A four-sided polygon with only two parallel sides.
2D-triangle	A three-sided polygon.
3D-cone	A shape whose base is a circle and whose sides taper up to a point.
3D-cube	An object that is comprised of six regular, solid, congruent square faces and has three equal axes at right angles to each other.
3D-cylinder	A surface formed by circles of a given radius that are contained in a plane perpendicular to a given axis, whose centers align on the axis.
3D-disc	A flat circular plate or anything with a similar shape.
3D-fibril	A small slender fiber or filament
3D-hexadron	Any polyhedron having six plane faces.
3D-needle	The geometry of an object that resembles a needle, meaning that it has a long slender cylindrical shape.
3D-oblate spheroid	The geometry of an object that is shaped like a spheroid compressed at the poles.
3D-polyhedron	A solid figure bounded by plane polygons or faces.

3D-prolate spheroid	A spherical shape that has a polar diameter that is longer than its equatorial diameter.
3D-rod	An object resembling a slender bar.
3D-sphere	A solid or hollow three-dimensional object bounded by a closed surface such that every point on the surface is equidistant from the center.
3D-tetrahedron	The geometry of an object which is comprised of a polyhedron containing four faces.
3D-tetrapod	The geometry of an object that consists of four rods in a tetrahedral arrangement.
activation effect	The result of having the sample undergo the process of activation. (i.e. cleavage of a bond, release from quenching or encapsulation)
activation method	The process that allows the sample to realize its intended functionality.
agent	An active power or cause (as principle, substance, physical or biological factor, etc.) that produces a specific effect.
animal study	An animal that is amenable to experimentation and whose physiological or pathologic mechanisms are sufficiently similar to those of a human for the animal to serve as a model.
antibody	A type of protein made by B-lymphocytes in response to a foreign substance (antigen). Each antibody only binds to a specific antigen, helping to destroy the antigen directly or by assisting white blood cells to destroy the antigen.
antigen	Any substance, generally a protein that stimulates the immune system and elicits an immune response. Recognition by the immune system elicits either a T-lymphocyte response, recognizing processed antigens, or a B-lymphocyte response, producing antibodies that bind to unprocessed antigens.
apoptosis	An active process of selective destruction of differentiated cells in multicellular organisms, apoptosis is one of two mechanisms by which cell death occurs (the other being necrosis, a pathological process). Important in ontogenesis, tumorigenesis, tissue turnover, lymphocyte selection and function, hormone-induced atrophy, etc., it serves as a balance to mitosis in regulating the size of animal tissues and in mediating pathologic processes associated with tumor growth. Apoptosis is responsible for physiological deletion of cells and appears to be intrinsically programmed. It is characterized by distinctive morphologic changes in the nucleus and cytoplasm, including chromatin cleavage at regularly spaced sites and endonucleolytic cleavage of genomic DNA (DNA fragmentation) at internucleosomal sites.
aspect ratio	The ratio between the longest and shortest dimension of an object.
associated element	An entity in the sample that is chemically associated with another entity in the sample.
attachment	The act of affixing one thing to another.
average diameter	The mean diameter of the fullerene component of a sample.
bacterial/yeast/mold	A test to determine if the sample has been contaminated by bacteria, yeast, or mold.
bioluminescence	The emission of light in an organism through a physiological process or in an experimental system that mimics the physiological conditions.
biopolymer	A type of polymer produced by living organisms. See also polymer. In the context of caNanoLab, a biopolymer can be either a nanomaterial entity or a functionalizing entity.
blood contact	Assays that examine how the sample interacts with whole blood, blood-borne molecular components, platelets or red blood cells.

book chapter	One of the main sections into which the text of a book is divided.
boolean	The type of an expression with two possible values, "true" and "false". Also, a variable of Boolean type or a function with Boolean arguments or result. The most common Boolean functions are AND, OR and NOT.
branch	An oligomeric or polymeric construct that extends from the parent macromolecule.
bulk phase	The substance in an emulsion that usually makes up the largest portion of the emulsion and contains another substance suspended within.
CFU_GM	A functional (qualitative) as well as quantitative assay that is utilized as an indicator of granulopoiesis reconstitution.
carbon nanotube	Carbon nanotubes (CNTs) are fullerene-like nanostructures that consist of graphene cylinders. The ends of the construct are closed with pentagonal-shaped rings.
caspase 3 apoptosis	The ratio of assay signal in the sample treated with the experimental agent to that of samples treated with the control. This ratio is expressed as a part per 100.
cell binding/internalization	Test that examines the ability of a sample to bind to or be internalized by cells.
cell death method	The indication of how the cells died in a cytotoxicity experiment (necrosis or apoptosis).
cell line	A permanently established cell culture that will proliferate indefinitely given appropriate fresh medium and space.
cell viability	A cellular process that directly affects the ability of a cell to proliferate, grow, divide, or repair damaged cell components. (NCI)
centrifugation	Process of using a rotating machine to generate centrifugal force to separate substances of different densities, remove moisture, or simulate gravitational effects.
characterization	A series of analytical methods that provide information about nanoscale entities such as composition, structure and defects. This information is critical for nanoparticle preparation, the study of properties, use, and reproducibility of the material.
charge	The quantity of unbalanced electricity in a body (either positive or negative) and construed as an excess or deficiency of electrons.
chemical association	Any process of combining chemical entities that is dependent upon chemical forces.
charge	The quantity of unbalanced electricity in a body (either positive or negative) and construed as an excess or deficiency of electrons.
chemotaxis	The characteristic directional movement or orientation of an organism or cell along a chemical concentration gradient either toward or away from the chemical stimulus.
chirality	A measure of the degree of geometrical symmetry in the structure of the nanotube. The resultant symmetry is quantified based upon the on the material properties of the construct.
clinical trials	Research conducted with human subjects or on material of human origin in which an investigator directly interacts with human subjects; includes development of new technologies, study of mechanisms of human diseases, therapy, clinical trials, epidemiologic, behavior, and health services research.
coagulation	The clotting of blood.
coat	A thin outer layer or film covering something.

colloid	A mixture of microscopic particles suspended in some sort of liquid medium.
colloid-emulsion	A suspension of liquid within another liquid or a dispersion consisting of two or more liquid phases.
colloid-gel	Jelly like material formed by the coagulation of a colloidal liquid.
colloid-sol	A colloid that has a continuous liquid phase in which a solid is suspended in a liquid.
complement activation	The complement system consists of more than 30 proteins engaged in host defense. It provides both an independent immune system capable of attacking microbes as well as other foreign material and an adjunct to the antibody system. Once activated, the complement system fires in a cascade-like fashion in which one component activates the next. Both swift and powerful, millions of complement components can deposit on an invading microbe within only a few minutes. Such a potent system requires strict regulation to avoid host injury. Membrane cofactor protein (MCP) is one critical regulator aimed at controlling inadvertent complement activation on host cells and nearly every cell examined expresses MCP on its cell membrane.
composing element	A distinguishable part of an entity. (i.e. a monomer found in a polymer, a terminal group for a dendrimer)
composition	The way in which the sample is made, especially in terms of its different parts; its constituents.
core	The center of an object; indispensable
covalent bond	A physical connection between two atoms or radicals in which a chemical bond is formed by sharing electrons.
critical concentration	The concentration of a solute or dispersion above which spontaneous aggregation or precipitation occurs.
culture media	A liquid or gel designed to support the growth of microorganisms or cells.
cytokine induction	A class of soluble glycoproteins, which act nonenzymatically through specific receptors to regulate immune responses. Cytokines are derived from both immune and non-immune cells and are intercellular mediators that differ from hormones in that they are produced by a number of tissue or cell types rather than by specialized glands.
cytotoxic activity	The interaction with virus-infected or transformed cells by diverse adhesion or co-stimulatory molecules and release of cytokines, chemokines, and lethal chemicals from granules.
cytotoxicity	Examines the cell destruction and/or death caused by nanoparticles. It can be dependent upon the nanoparticle itself, the agent and dosage it carries, the target cell type, etc.
DNA	A long linear double-stranded polymer formed from nucleotides attached to a deoxyribose backbone and found in the nucleus of a cell; associated with the transmission of genetic information.
data curator	Signifies a user that submits data
dendrimer	A dendrimer is a polymeric molecule which has a highly-branched, three-dimensional architecture. Dendrimers are synthesized from monomers and new branches are added in discrete steps to form a tree-like architecture. A high level of synthetic control is achieved through iterative reactions and purification at each step to regulate the size, architecture, functionality and monodispersity of the molecules. These polymers have desirable pharmacokinetic properties and a polyvalent array of surface groups that make them potential drug delivery vesicles.
diagnostic imaging	Nanoparticles can be directed to exact regions of the body with agents, such as radioactive isotopes that display under imaging techniques.

digital object identifier	A unique code used by publishers in the identification and exchange of the content of a digital object, such as a journal article, web document, or other item of intellectual property. The DOI consists of two parts: a prefix assigned to each publisher by the administrative DOI agency and a suffix assigned by the publisher that may be any code the publisher chooses.
dispersed phase	The substance in an emulsion that is suspended or dispersed within another substance of greater volume.
editorial	An article in a publication giving the opinion of its editors on a given topic or current event.
electromagnetic radiation	The radiation of energy as transverse waves are produced by moving charges
electrostatic attraction	The attraction between dissimilar exposed charges on two or more molecules.
emulsifier	A chemical substance that functions to stabilize an emulsion.
emulsion	An emulsion is a suspension of liquid within another liquid or a dispersion consisting of two or more liquid phases. In the context of caNanoLab, an emulsion nanoparticle consists of nanoparticles suspended in an emulsifying liquid.
encapsulation	The process or condition of being enclosed.
endotoxin	A test to determine the presence of lipopolysaccharide complexes that are part of the outer membrane of the cell wall of Gram-negative bacteria such as *E. coli*, *Salmonella*, *Shigella*, *Pseudomonas*, *Neisseria*, *Haemophilus*, and other leading pathogens.
entrapment	A molecular interaction in which a small molecule or structure becomes trapped, usually in a larger molecule or structure, due to non-covalent interactions.
enzyme induction	Involves initiation of function of a biological molecule (usually protein, RNA, or DNA) that possesses catalytic activity.
enzymatic cleavage	The breaking of chemical bonds in the sample by an enzyme.
fab	Part of an immunoglobulin antibody that binds a specific antigen and consists of both a light chain and part of a heavy chain. By comparison, natural antibodies consist of two heavy and two light chains. An FAB (fragment antibody) offers the advantages of smaller size and lower cross-reactivity compared to the complete antibody.
fluid	A continuous amorphous substance that tends to flow and to conform to the outline of its container (i.e., a liquid or a gas). Also used as an adjective to describe something with properties like that of a fluid.
fluid-gas	A fluid in the gaseous state having neither independent shape nor volume and being able to expand indefinitely.
fluid-liquid	A substance in the fluid state of matter having no fixed shape but a fixed volume.
fluid-vapor	The gaseous state of matter that is a solid or liquid at normal room temperature.
fluorescence	Fluorescence is a luminescence (i.e., optical phenomenon) in cold bodies, in which a molecule absorbs a high-energy photon, and re-emits it as a lower-energy (longer-wavelength) photon. The energy difference between the absorbed and emitted photons ends up as molecular vibrations (heat).
freeze thaw	The act or event which causes the transition from a liquid to solid matter phase, and the process whereby heat changes something from a solid to a liquid.
fullerene	A fullerene is one of three known pure forms of carbon that exhibits a spherical shape with a hollow interior; named after Buckminster Fuller. The number of carbon atoms comprising

	fullerenes is variable; several stable spherical carbon structures containing 70 or more atoms have been documented.
full summary	Where all the characterizations within the category appear as individual detailed tables in one window.
function	The characteristic behavior of a nanoparticle that results from the composition and properties of the entity.
functionalizing entity	Any component of the sample that has been added to a nanoparticle and imparts a function on the sample.
gene expression	Transcription of genetically encoded information into an intermediary message (messenger RNA) and subsequent translation into a functional protein.
generation	The number of polymerization cycles completed in the synthesis of a dendrimer.
GSH homeostasis	A test that measures the ratio of reduced to oxidized glutathione to determine if oxidative stress is occurring.
hemolysis	Disruption of the integrity of the erythrocyte membrane causing release of hemoglobin.
hydrogen bond	The physical association between an electronegative atom and a hydrogen atom that is directly bound to a second, relatively electronegative atom.
IgA	IgA is the immunoglobulin subclass that is associated with antibody-mediated mucosal immunity. It is secreted as dimers into the mucosa and is the most effective isotype at fixing complement by the alternative pathway, even though it lacks the ability to fix complement by the classical pathway. There are two subtypes in the human - IgA1 and IgA2.
IgD	An immunoglobulin isotype (subclass). This isotype is expressed on naive B cells along with IgM. Little is known about its physiologic role.
IgE	An immunoglobulin isotype (subclass). This isotype has the unique ability to bind with high affinity to IgE receptors (FceRI) on mast cells and basophils and induce degranulation and cytokine production by these cells when they are crosslinked by antigen. In addition to a central role in atopy and allergic responses, it has been speculated that IgE-mediated mast cell degranulation, by its release of mediators that increase vascular permeability, has an important role in the initiation of immune response in general.
IgG	An immunoglobulin isotype (subclass) that characterizes secondary immune responses. This isotype is further broken down into several smaller subclasses (IgG1, IgG2a, IgG2b, IgG3 in the mouse; IgG1-4 in the human), and each subclass is differentially synthesized and secreted into the serum upon differential immune stimuli.
IgM	The major immunoglobulin secreted during a primary immune response. IgM binds with low affinity but high avidity (multiple binding sites) because it not only occurs as monomers but also as pentamers and hexamers.
image contrast agent	Substances administered during diagnostic procedures that allows delineation of internal structures. Contrast agents appear opaque due to the difference in absorption of X-rays or other electromagnetic waves and surrounding tissue.
imaging	Nanoparticles can be directed to exact regions of the body with agents, such as radioactive isotopes that display under imaging techniques.
imaging function	An element that allows the sample to function as an imaging agent.
immune cell function	A set of laboratory assays that examine the responses of lymphoid or myeloid cells after exposure to an experimental material.
immunotoxicity	Adverse effects to the immune system.

infrared	Electromagnetic radiation with wavelengths between 750 nanometers and 1 millimeter, between those of visible light and microwaves. This portion of the electromagnetic spectrum can usually be sensed as heat.
inherent function	This term refers to any functional characteristics that are intrinsic to a composing element of a nanoparticle.
initiator	A substance that initiates or facilitates the synthesis of a polymer. This substance may or may not reside in the final polymer.
in preparation	Refers to a document that is in draft and has not yet been submitted for publication
in press	Refers to a document that was accepted but is not yet published
in vitro assay	A laboratory test or analysis of the biological activity of a substance performed by studying its effect in an experimental situation outside the organism, e.g. in the test tube rather than in living systems.
in vitro characterization	The determination of the effect of nanoparticles on living cells in an artificial laboratory environment outside of the living organism.
in vivo assay	A laboratory test or analysis of the biological properties or activities of a substance performed by testing its effect on an organism.
ionic bond	Formation of a chemical bond following a transfer of electrons between two ions with opposite charges.
isotype	The genetic or structural type for the constant region of an antibody.
LC50	The concentration of a chemical or biologic preparation that is likely to cause death in 50% of the animals or cells being tested.
leukocycte proliferation	The growth and reproduction of white blood cells. Refers to a blood cell that does not contain hemoglobin. White blood cells include lymphocytes, neutrophils, eosinophils, macrophages, and mast cells. These cells are made by bone marrow and help the body fight infection and other diseases.
linkage	Involves temporary, non-covalent binding of two or more molecules as a result of intermolecular physical forces and often involves spatial complementarity between the interacting objects.
lipid	A class of hydrocarbon-containing organic compounds. Lipids are insoluble in water but soluble in nonpolar solvents and play important roles in living organisms: these roles include functioning as energy storage molecules, serving as structural components of cell membranes, and constituting important signaling molecules. Lipids can be subdivided into 2 groups: fatty acids and glycerides.
liposome	Liposomes are substances composed of layers of lipid that form hollow microscopic spheres within which drugs or agents could be contained for enhanced safety and efficacy. Based upon its size measured in nanometer range, a liposome can be categorized as a nanoparticle.
lipid peroxidation	A test that measures the ratio of reduced to oxidized glutathione to determine if oxidative stress is occurring.
long term storage	The act of safekeeping goods in a depository for a long period of time.
lyophilization	A dehydration process typically used to preserve a perishable material. The specimen is frozen and then dehydrated at low temperature in a high vacuum.
MRI	Imaging that uses radiofrequency waves and a strong magnetic field rather than x-rays to provide amazingly clear and detailed pictures of internal organs and tissues. The

	technique is valuable for the diagnosis of many pathologic conditions, including cancer, heart and vascular disease, stroke, and joint and musculoskeletal disorders.
magnetic particle	
mean	The sum of a set of values divided by the number of values in the set.
median	The value which has an equal number of values greater and less than it.
metabolic stability	A test that examines the integrity of a sample after exposure to different physiological conditions, e.g. Exposure to metabolizing enzymes.
metal particle	A metal particle is a nanoparticle composed of electropositive chemical elements characterized by ductility, malleability, luster, and conductance of heat and electricity. They can replace the hydrogen of an acid and form bases with hydroxyl radicals.
mitochondrial function	A test that examines the functioning of the mitochondria in live cells after exposure to an experimental sample.
mitochondrial membrane potential	A test that examines the electric potential across the membranes of the mitochondria in live cells after exposure to an experimental sample.
modality	The specific method used for capturing images when the sample is able to function as an image contrast agent.
mode	The value which occurs most often in a set of values. If no value is repeated, there is no mode. If more than one value occurs with the same greatest frequency, each value is a mode.
modifier	A chemical that influences the properties of another chemical or biological function.
molecular weight	The sum of the relative atomic masses of the constituent atoms of a molecule.
monomer	A chemical subunit that can undergo polymerization by bonding to other subunits.
Mycoplasma	A test to determine the presence of a genus of nonmotile facultatively anaerobic bacteria that lack a true cell wall, are gram-negative, and require sterol for growth.
NCI	National Cancer Institute
NK Cell Cytotoxic Activity	The interaction with virus-infected or transformed cells by diverse adhesion or co-stimulatory molecules and release of cytokines, chemokines, and lethal chemicals from granules.
NMR	A physical phenomenon involving the interaction of atomic nuclei placed in an external magnetic field with an applied electromagnetic field oscillating at a particular frequency. Magnetic conditions within the material are measured by monitoring the radiation absorbed and emitted by the atomic nuclei. It is the underlying principle of Magnetic Resonance Imaging (MRI).
nanohorn	
nanorod	
nanoparticle	A nanoparticle is defined as a small, stable particle, whose size is measured in nanometers. These particles are used in biomedical applications in which they serve as drug carriers or imaging agents. Various targeting agents, such as antibodies, drugs, imaging agents, and reporters can be attached to the surface of a nanoparticle.
nanoparticle entity	The component of a sample that is a nanoparticle.

nanoparticle sample	A nanoparticle-containing sample used in experimental studies.
necrosis	The pathologic localized death of living cells, as from infection or interruption of the blood supply, generally associated with severe cellular trauma caused by progressive degradation by enzymes. Characterized by mitochondrial swelling, nuclear flocculation, and uncontrolled cell lysis, it is unprogrammed death of living tissue and cells.
neutron scattering	Radiation of neutrons during radioactive decay.
observed	Ascertained or determined through monitoring or observation.
oxidative burst	A process that consists of the rapid release of reactive oxygen species. The process frequently occurs in cells when superoxide radical and hydrogen peroxide species are released.
oxidative stress	A disturbance in the pro-oxidant-antioxidant balance in favor of the former, leading to potential damage. Indicators of oxidative stress include damaged DNA bases, protein oxidation products, and lipid peroxidation products. The damage to biological tissues is caused by superoxide and other free radicals generated by many factors, including exposure to alcohol, medications, trauma, cold, toxins, and radiation or by antimicrobial cellular immunity, metabolic abnormality, or "normal" aging; not synonymous with hypoxia or hyperoxia.
PDI	Polydispersity_Index A measure of the distribution of molecular weights in a given polymer sample. The PDI calculated is the weight average molecular weight divided by the number average molecular weight. It indicates the distribution of individual molecular weights in a population of polymers.
PET	A technique for measuring the gamma radiation produced by collisions of electrons and positrons (anti-electrons) within living tissue. In positron emission tomography (PET), a subject is given a dose of a positron-emitting radio nuclide attached to a metabolically active substance (for example, 2-fluoro-2-deoxy-D-glucose (FDG), which is similar to a naturally occurring sugar, glucose, with the addition of a radioactive fluorine atom). When living tissue containing the positron emitter is bombarded by electrons, gamma radiation produced by collisions of electrons and positrons is detected by a scanner, revealing in fine detail the tissue location of the metabolically-active substance administered.
peer review article	A journal article that was subjected to the scrutiny of experts in the field prior to publication.
peak1	A peak on a graph. If there are multiple peaks, the most extreme possible amount or value; the highest point.
peptide	Organic compound composed of amino acids linked together chemically by peptide bonds. The peptide bond always involves a single covalent link between the alpha-carboxyl (oxygen-bearing carbon) of one amino acid and the amino nitrogen of a second amino acid.
pH	Quantity of dimension one used to express on a scale from 0 to 14 the amount-of-substance concentration of hydrogen ion of dilute aqueous solution, calculated as the logarithm of the reciprocal of hydrogen-ion concentration in gram atoms per liter.
phagocytosis	Endocytosis of particulate material, such as microorganisms or cell fragments, into membranous phagosomes that fuse with lysosomes and result in digestion of the ingested material.
pharmacokinetics	The characteristic movements of drugs within biological systems, as affected by absorption, distribution, binding, elimination, biotransformation, and excretion; particularly the rates of such movements.
physical assay	A procedure for evaluating the physical properties of the sample.
physico-chemical characterization	The determination of the material, structural and chemical properties of a nanoparticle.

physical state	The indication that a chemical form is solid, liquid, or gas.
plasma protein binding	An assay that measures the interaction of plasma proteins with the nanoparticle sample.
platelet aggregation	The accumulation and adherence of platelets to form a clot or thrombus. When injury or bleeding occurs, platelets clump together at the site of injury; they expand and adhere to the injured area, thereby acting as a plug to reduce the bleeding. Platelet dysfunction can result in blood clotting and bleeding disorders.
polymer	A key feature that distinguishes polymers from other molecules is the repetition of a linked series of many identical, similar, or complementary monomers. A polymer nanoparticle is a polymer measured in nanometer range.
probe	General term for a piece of DNA or RNA corresponding to a gene or sequence of interest, that has been labeled either radioactively or with some other detectable molecule, such as biotin, digoxygenin or fluorescein. As stretches of DNA or RNA with complementary sequences will (hybridize), a probe will label viral plaques, bacterial colonies or bands on a gel that contain the gene of interest. |On-line Medical Dictionary.
proliferation	Growth and reproduction of new similar forms, e.g. cells, buds, or offspring.
protein	A group of complex organic macromolecules composed of one or more chains (linear polymers) of alpha-L-amino acids linked by peptide bonds and ranging in size from a few thousand to over 1 million Daltons. Proteins are fundamental genetically encoded components of living cells with specific structures and functions dictated by amino acid sequence.
published	Refers to a document that was accepted and published
purity	In the context of caNanoLab, refers to the degree of being free of contaminants or heterogeneous components.
quantum dot	A quantum dot is a nanometer-sized semiconductor particle, made of cadmium selenide (CdSe), cadmium sulfide (CdS) or cadmium telluride (CdTe) with an inert polymer coating. The semiconductor material used for the core is chosen based upon the emission wavelength range being targeted: CdS for UV-blue, CdSe for the bulk of the visible spectrum, and CdTe for far red and near-infrared. The size of the particle determines the exact color of a given quantum dot. The polymer coating protects cells from cadmium toxicity but also facilitates the attachment of a variety of targeting molecules, including monoclonal antibodies directed to tumor-specific biomarkers.
radio labeling	A laboratory procedure that results in the incorporation of a radioactive isotope into a molecule of interest.
radioisotope	
RMS-size	The root mean square size is the square root of the mean value for the squares of the sizes measured for particles in the sample.
Raman spectroscopy	Emission of electromagnetic energy with a shorter frequency (longer wavelength) than that of the incident monochromatic light. Arises from the low probability absorption of quanta with a higher energy than that required for a transition: the difference in energy is emitted as a lower frequency (energy) photon. Allows analysis of vibrational and rotational energy levels using visible incident light.
receptor	Cell surface proteins that bind signaling molecules external to the cell with high affinity and convert this extracellular event into one or more intracellular signals that alter the behavior of the target cell (From Alberts, Molecular Biology of the Cell, 2nd ed, pp693-5). Cell surface receptors, unlike enzymes, do not chemically alter their ligands.
relaxivity	A measure of the ability of magnetic compounds to increase the relaxation rates of the surrounding water proton spins in nuclear magnetic resonance applications.

relaxivity: R1, R2, T1, T2	R1 = The relaxation rate of the net nuclear spin polarization in the direction of the magnetic field of a spectrometer back to its equilibrium value. R2 = The relaxation rate of spin polarization in the plane perpendicular to the magnetic field of a spectrometer back to zero as precessing spins loose coherence with each other. T1 = The time it takes for the net nuclear spin in the plane that is parallel to the magnetic field of a spectrometer to return to its equilibrium value. T2 = The time it takes for the net nuclear spin in the plane that is perpendicular to the magnetic field of a spectrometer to decay to zero.
repeat unit	The simplest chemical structure that is identical to all of the other units in a polymer.
report	A short textual account; having provided a short account.
researcher	Signifies user who has read-only access to both local and remote data
review	A journal article that summarizes the progress in some particular area or topic during a preceding period.
RNA	A nucleic acid molecule similar to DNA but containing ribose rather than deoxyribose. RNA is formed upon a DNA template. There are several classes of RNA molecules. They play crucial roles in protein synthesis and other cell activities.
ROS Generation	An oxygen species that carries an unpaired electron (e.g., the hydroxyl radical and the superoxide anion). These radicals are very powerful oxidizing agents and cause structural damage to proteins and nucleic acids.
SMARTS	A linear notation used to specify the substructural patterns in a molecule.
SMILES	Specification for unambiguously describing the structure of chemical molecules using short ASCII strings. SMILES strings can be imported by most molecular editors for conversion back into two-dimensional drawings or three-dimensional models for the molecules.
SPECT	A type of tomography in which gamma photon-emitting radio nuclides are administered to the patient and then detected by one or more gamma cameras rotated around the patient. From the series of two-dimensional images produced, a three-dimensional image can be created by computer reconstruction.
safety	The state of being certain that adverse effects will not be caused by some agent under defined conditions.
sample	A sample is a formulation of a base nanoparticle platform and any additional components that contribute to the function(s) of the nanoparticle. A sample can also be a control used in comparative analysis.
sample characterization	Describing distinctive characteristics or essential features of the sample determined through analytical methods is necessary to record information associated with sample synthesis and properties.
sample composition	The elements that make up the experimental sample
sample concentration	The quantity of a specimen per unit volume or weight; a measure of the amount of substance present in a unit amount of mixture, particularly, the amount of solute dissolved in a solvent. The amounts can be expressed as moles, masses, volumes, or parts.
sample preparation	The act or process of making a substance ready for further study.
ScFv	A genetically engineered antibody consisting of both the variable heavy chain (VH) and the light chain (VL) of an immunoglobulin. These entities are joined together by a flexible peptide linker.
sequence	A serial arrangement in which things follow in logical order or a recurrent pattern.”

shape	The spatial arrangement of a nanoparticle as represented in its external surface or outline of specific form or figure.
shell	A rigid covering that envelops an object.
short term storage	The act of safekeeping goods in a depository for a short period of time.
size	The physical magnitude of a nanoparticle.
solid	The state in which a substance has no tendency to flow under moderate stress; resists forces (such as compression) that tend to deform it; and retains a definite size and shape.^^
solid-crystal	A solid formed by the solidification of a chemical and having a highly regular atomic structure.
solid-fibril	A small slender fiber or filament.
solid-glass	A brittle transparent solid with irregular atomic structure.
solid-granule	Any small grainlike particle.
solid-powder	A solid substance in the form of tiny loose particles; a solid that has been pulverized.
solubility	In the context of caNanoLab, refers to the ability and then the quantity of a nanoparticle to dissolve in a particular solvent (yielding a saturated solution).
solvent media	A liquid that dissolves or that is capable of dissolving; the component of a solution that is present in greater amount.
sonication	A technique that uses sound energy to agitate or disrupt the components of a sample.
small molecule	A molecule with a low molecular weight that is not determined by a genome sequence.
standard deviation	A measure of the range of values in a set of numbers. Standard deviation is a statistic used as a measure of the dispersion or variation in a distribution, equal to the square root of the arithmetic mean of the squares of the deviations from the arithmetic mean.
sterility	A test to determine if the sample has any microbiological contaminants.
submitted	Refers to a document that was submitted but has not been accepted as a publication
summary	A view where all the characterizations within the category appear in one table.
surface	The extended two-dimensional outer boundary of a nanoparticle.
surface area	A measurement of the extended two-dimensional outer boundary of a three-dimensional object.
surface chemistry	The chemical properties of the surface of the sample.
synthesis	The process of producing a chemical compound, usually by the union of simpler chemical compounds.
targeting	Nanoparticles can be designed to target tumors, or other areas of interest.
targeting function	An element that allows the sample to function as an targeting agent.
temperature	A measure of the average kinetic energy of a system of particles. Temperature may be

	quantified, in the context of thermodynamics, as the potential of one system to transfer thermal energy to another system until both systems reach a state of thermal equilibrium.
terminal group	A chemical structure found at the ends or on the surface of a larger molecule or chemical entity.
therapeutic function	The use of nanoparticles for therapeutic applications in a clinical setting. This method entails the attachment of a drug to the surface of nanoparticles. The role of the nanoparticle is to facilitate delivery of the drug to a cellular target that it would not reach in its free form.
therapeutic function	An element that allows the sample to function as an therapeutic agent.
toxicity	The finding of bodily harm due to the poisonous effects of something.
transfection	A permanently established cell culture that will proliferate indefinitely given appropriate fresh medium and space.
toxicology	The branch of pharmacology that deals with the nature and effects and treatments of poisons.
type	The indication that a whole antibody or an antibody fragment is a component of the sample.
ultrasound	Very high frequency sound
ultraviolet	The invisible ultraviolet spectrum makes up one specific portion of sunlight. This unique portion accounts for three percent of all solar radiation reaching the earth. UV radiation causes many health problems.
units of measurement	% = percent %mole = percent of total moles %vol = percent of total volume %wt/vol = percent weight per volume a.u. = atomic units aC = attocoulomb Ah = ampere hour C = coulomb esu = electrostatic unit of charge r = Franklin g = gram g/ml = grams per milliliter kDa = kiloDaltons mg = milligram mg/ml = milligrams per milliliter mV = millivolt nm = nanometer nm^2 = square nanometer statC = statcoulomb ug = microgram ug/ml = micrograms per millilieter ug/ul = micrograms per microliter ul = microliter
van der Waals attraction	The weak attraction between two or more chemical entities that is caused by the polarization of adjacent atoms or molecules.
visibility	The access to objects granted to logged in users.

whole	Including all components without exception; being one unit or constituting the full amount or extent or duration; complete. In the context of caNanoLab, this term represents the use of a complete antibody molecule.
x-ray	Gamma rays and X-rays are similar forms of electromagnetic radiation. Gamma rays are distinguished from X rays by their origin. Gamma rays are produced by nuclear transitions while X-rays are produced by energy transitions due to accelerating electrons. Because it is possible for some electron transitions to be of higher energy than nuclear transition, there is an overlap between low energy gamma rays and high energy X-rays. Gamma rays are considered to be electromagnetic radiation with wavelengths of 1 nanometer or shorter while x-rays are between approximately.01 nanometers and 200 nanometers.
Z-average	A parameter used for calculations involving mechanical properties. The parameter is measured by using dynamic light scattering to obtain the intensity weighted mean hydrodynamic size of a collection of particles.
Z-score	A measurement that indicates how far and in what direction an item deviates from its distribution's mean, expressed in units of its distribution's standard deviation.
zeta potential	The magnitude of the electrical potential as generated by ion accumulation at the particulate surface. This surface consists of two layers, the Stern layer and the diffuse layer, which comprise an electrical double-layer. The measurement of the electrical potential provides important information regarding the dispersion mechanism, the degree of particle dispersion and the electrostatic potential of the sample.